e-Healthcare service quality: consumer satisfaction and its association with demographic characteristics

Prachi Verma and Satinder Kumar
School of Management Studies, Punjabi University, Patiala, India, an
Sanjeev K. Sharma
University Institute of Applied Management Sciences, Panjab University, Sector-14, Chandigarh, India

ived 17 January 2020
sed 24 February 2020
14 March 2020
2 June 2020
3 June 2020
Accepted 11 June 2020

Abstract

Purpose – Use of technology for quality healthcare services has developed into a new field known as "e-Healthcare services." Healthcare providers often judge their quality of services with consumer satisfaction. With e-Healthcare services, consumer satisfaction is influenced by the quality of healthcare services provided and the demographic characteristics. The purpose of the present case study is to recognize the important predictors of quality, which are significant for consumer satisfaction with e-Healthcare services by using Zineldin's 5Qs model. It also aims to find the strength of association among the predictors of consumer satisfaction and the demographic characteristics of the respondents.

Design/methodology/approach – A questionnaire-based study was conducted at a public (PGIMER, Chandigarh) and a private hospital (Fortis Hospital, Mohali) of Punjab, India, from February 2018 to March 2019. The structured, closed-ended questionnaire, to be marked on a 1–5 point Likert scale, was adapted from Zineldin's 5Qs model and was distributed to the respondents sitting in the waiting halls of the selected hospitals. The respondents comprised of both the patients and their attendants who were aware of e-Healthcare services and were using them.

Findings – The analysis identified quality of interaction, quality of hospital atmosphere and quality of object to be the key predictors of consumer satisfaction with e-Healthcare services. The results reveal a strong association between different demographic characteristics and overall consumer satisfaction with e-Healthcare services.

Practical implications – The results suggest that improvements in the quality of interaction, quality of hospital atmosphere and quality of object may result in higher consumer satisfaction with e-Healthcare services. Working on the identified dimensions of quality will help the e-Healthcare providers in identifying functional problems of e-Healthcare services and developing improvement strategies, which will also result in better health and quality outcomes. The results of this study will help the e-Healthcare providers in better segmentation of e-Healthcare consumers based on their demographic characteristics and in developing better marketing strategies.

Originality/value – This paper focuses on the quality of e-Healthcare services only and attempts to identify the quality dimensions, which leads to the satisfaction of e-Healthcare consumers. The identified quality dimensions will help in designing better e-Healthcare services and framing policies. It also highlights the association of demographic characteristics with important quality dimensions.

Keywords e-Healthcare consumer, Consumer satisfaction, Demographic characteristics, Zineldin's 5Qs model, Service quality dimensions

Paper type Case study

1. Introduction

The solicitation of technology into healthcare services has resulted in an arena popularly known as e-Health services, which are purported to transform the existing healthcare system of developing countries such as India. Besides being proficient, time and cost paybacks are the apparent reasons for the fast adoption of this service. It has not only impacted the accessibility and mode of delivery of healthcare services, but has also made the consumer an

International Journal of Health Care Quality Assurance

0952-6862
DOI 10.1108/IJHCQA-02-2020-0030

essential stakeholder of the healthcare delivery system. Such benefits have transformed consumers to slowly shift from the traditional healthcare services existing in India to e-Healthcare services.

In e-Healthcare services, patients, as well as healthy individuals, are continuously searching for health information and using various online platforms. Thus, the traditional patient is now commonly addressed as "Consumers or Customers" (Deber *et al.*, 2005). Punjab is a state of northern India, where e-Healthcare services are being offered at various levels by different public and private hospitals. To redesign the quality management process, it is imperative to consider the service quality perceptions of e-Healthcare consumers.

1.1 Role of demographics

Delivery of e-Healthcare services involves complex processes with multiple steps as the services differ from patient to patient. Disparities exist in Indian consumers based on urban and rural communities, earnings, education, caste and religion (Geetha Rani, 2014). The selection of healthcare services also largely depends on age, gender, education and income. Patients from different regions, age groups, income classes, education groups and employment types approach various hospitals for their treatment. Healthcare needs also alter with gender and age. It is important to consider the change in perception of quality for different demographic characteristics, since these variables play a significant role in a consumer's healthcare decision-making. Moreover, analyzing e-Healthcare quality under various dimensions, along with the demographics, will yield more comprehensive health results.

1.2 Measurement of service quality

Healthcare service quality plays a crucial role in patient satisfaction and is also one of the most significant quality improvement steps (Izadi *et al.*, 2017). Hospitals strive to identify the critical factors that will influence improved services in future (Meesala and Paul, 2018). Patient satisfaction is a multidimensional construct that is affected by many variables (Naidu, 2009). It is also an important corporate strategy (Dagger *et al.*, 2007) and tactical tool, used to reinforce an organization's competitive position and fortify its profits (Izadi *et al.*, 2017; Al Neyadi *et al.*, 2018). Consumer participation in e-Healthcare is critical to providing quality services. Providing high-quality care and improving consumer satisfaction are the goals of any healthcare organization (Zineldin, 2006). A satisfied consumer is more likely to return to a healthcare organization and to bring in additional patients as a result of their positive recommendations (Zeithaml *et al.*, 2000; Butt and de Run, 2010). Measuring the view of the consumers is important for healthcare organization to ensure their responsiveness to clients (Aliman and Mohamad, 2016). Patient satisfaction surveys help to understand the needs of consumers, to make strategic plans for effective quality services and to enhance patient adherence to doctor's recommendations regarding treatment and appointment (Batbaatar *et al.*, 2017).

2. Review of literature

Healthcare consumers belonging to different backgrounds are believed to have different behavioral norms and different expectations of the healthcare provider quality (Palani Natha Raja *et al.*, 2007). Various demographic groups might observe certain dimensions of quality to be more significant as compared to others. Researchers in the past have found that demographic characteristics are linked to service quality perceptions and patient satisfaction (Kalepu, 2014). Grazier *et al.* (1986) found that a consumer's healthcare plan choice is influenced by gender, age and income. Age is significantly related to dimensions of service

quality (Thompson and Kaminski, 1993) and is a critical demographic variable since purchase behavior, desires and needs of an individual change with age (Hansman and Schutjens, 1993). Age also has a substantial effect on responsiveness in service quality perception (Manulik *et al.*, 2018). Gender is also important for market segmentation within various industries (Kotler and Armstrong, 1991). Likewise, income and service quality expectations have also demonstrated a substantial relationship with service quality perceptions (Bishop Gagliano and Hathcote, 1994). Meesala and Paul (2018) found that older, married and less educated patients gave a higher rating to service quality as compared to younger, single and more educated patients.

However, Manulik *et al.* (2018) did not find any apparent influence of demographic characteristics on healthcare service quality and recommended that it should not be considered in the quality management process. Also, Batbaatar *et al.* (2017) found sociodemographic characters to be the most varied in healthcare service quality researches.

Quality in healthcare has always been linked with consumer satisfaction. Previous researchers have presented a strong correlation between the two and have cited various ways in which the quality of health services can be determined (Gupta and Rokade, 2016). Naidu (2009) identified patient satisfaction to be a multidimensional construct and concluded that patient satisfaction and service quality are essential for the improvement of services and the image of the hospital. To evaluate the experience of the respondents, it is essential to assess the perceptions of their family members as well, since during the process of treatment, family members tend to have a lower-level satisfaction with the treatment and services than the patient (Strasser *et al.*, 1995). Only the technical aspect of healthcare delivery services will yield strong results, but other aspects should also be considered since user acceptance has been identified as the most important parameter for the e-Healthcare system (Bakar *et al.*, 2008). It is easier for consumers to evaluate functional quality compared to technical quality (Butt and de Run, 2010). In their research on private Malaysian hospitals, Butt and de Run (2010) found that healthcare perceptions and expectations have a high correlation with their respective dimensions. Failure to encounter any dimension would result in a negative perception of service quality. Aliman and Mohamad (2016) found that tangibility, reliability and assurance were the strong predictors of patient satisfaction. The authors suggested that identification of areas requiring immediate improvement was important for policymakers for better response. Cheng Lim and Tang (2000), in their research on Singapore hospitals through SERVQUAL, identified the service characteristics considered important for patients. Assurance and responsiveness emerged as the critical dimensions of service quality. In their review, Batbaatar *et al.* (2017) found inconclusive and contradicting results regarding patient satisfaction studies due to the absence of a globally recognized design of patient satisfaction and measurement system. Meesala and Paul (2018) found reliability and responsiveness as important dimensions for service quality. Javed *et al.* (2019) also found similar results in their study. The study done by Al Neyadi *et al.* (2018) found assurance to be the most significant dimension and responsiveness to be the least significant dimension related to healthcare service quality. The authors also did not find any significant variation in the service quality perception of public and private hospital patients. However, Swain (2019) found that public hospitals were performing better on technical dimensions, and private hospitals performed better on functional dimensions.

2.1 Scales to measure service quality

In healthcare, service quality has been measured under various dimensions (Akter *et al.*, 2013). Gronroos (2000) built up an early two-dimensional model (technical and functional quality) of service quality measurement, which was further refined by Parasuraman *et al.* (1988). He defined service quality as the capability of an organization to satisfy or exceed the

consumer's expectation and acquired a popular scale to measure service quality known as SERVQUAL. It is identified as one of the most robust scales, focusing mainly on five dimensions, that is, reliability, responsiveness, assurance, empathy and tangibles (Talib *et al.*, 2015). However, the applicability of this model has been under question in different fields by some authors (Jauch and Orwig, 1997). It is difficult to determine the service quality indicators in a hospital situation by the SERVQUAL measurement scale (Butler *et al.*, 1996). Zineldin (2006) expanded technical, functional and the SERVQUAL model further with five new quality dimensions (5Qs), which is now popularly known as the 5Qs model. This model is believed to be more comprehensive with multidimensional attributes that are missing in SERVQUAL (Badri *et al.*, 2009). This model received acceptance as the five qualities are uniquely developed to measure consumer opinion on healthcare organizations (Gohain *et al.*, 2018). 5Qs model can be a useful method to enhance medical care and promote patient satisfaction. Few authors have attempted to differentiate between these two models and have found that both models focus on providing quality services. However, the 5Qs model has a broader range with few more additional attributes such as infrastructure, atmosphere and interaction, which play a significant role in the hospital environment. According to Zineldin (2006), this model is relevant in any healthcare setting, hospital or private health clinic where the patient, doctor, nurses and other healthcare providers are working in turn. Camgöz-Akdağ and Zineldin (2010) concluded that infrastructure and interaction were the most significant elements for providing quality care services and helping in problem identification. The interaction between doctors and consumers is also an important determinant of quality (Fincham and Wertheimer, 1986). Quality of hospital design, efficient communication and interaction result in patient satisfaction (Haron *et al.*, 2012; and Naik *et al.*, 2015). Gohen *et al.* 2018 added "social responsibility" as the sixth dimension to the 5Qs model to develop a loyalty framework.

5Qs model by Zineldin (2006) is a comprehensive model that can be useful for assessment of any service quality under five dimensions – quality of object, quality of process, quality of infrastructure, quality of interaction and quality of atmosphere (Figure 1). Here, according to Zineldin (2006), the quality of object refers to the accuracy of medical diagnosis and treatment; it defines the primary reason for consumers choosing e-Healthcare services. Quality of process defines functional quality as to how healthcare organizations are

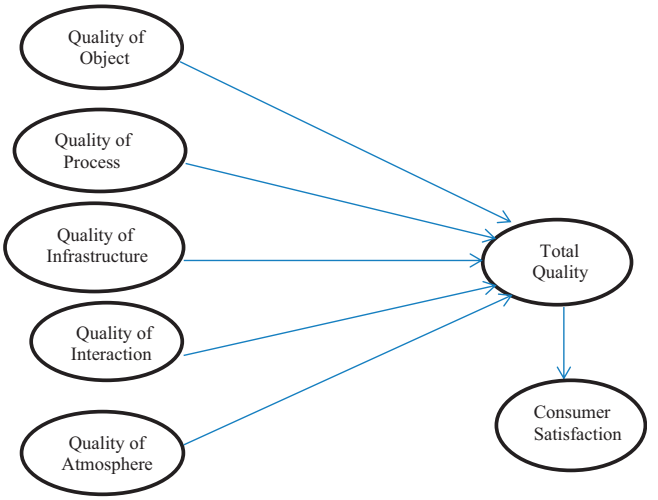

Figure 1.
Adopted from Zineldin (2006) – conceptual framework

providing e-Healthcare services and signify their practical applications. Quality of infrastructure refers to the types of resources and staff made available in the hospital to provide the required services. Quality of interaction indicates the methods adopted and the amount of time spent on communication among the patient and the healthcare providers, while quality of atmosphere evaluates the environment of the hospital in which the patient is availing e-Healthcare services. This model is effective in healthcare to assess consumer satisfaction. It is an amalgamation of technological, functional and SERVQUAL quality models and considered a valid and reliable instrument (Zineldin and Vasicheva, 2012). With the increasing popularity of e-services, Parasuraman *et al.* (2005) developed another scale for Internet service quality known as the ESQ scale, but this scale relates mainly to website quality. The same 5Qs model is an important tool for identifying the problems in the system and the areas with a scope of improvement for providing quality education from various dimensions (Zineldin *et al.*, 2012, 2014).

3. Importance of the study

Consumer satisfaction of quality of healthcare services remains a popular topic for research, but a review of the literature suggests that most of the research has been done using the SERVQUAL scale. Consumer satisfaction has been a less explored area regarding e-Healthcare services. Also, limited research has examined the association between demographic characteristics and e-Healthcare consumer satisfaction. Previous researchers have focused mainly on the traditional existing healthcare services in India. This study focuses on e-Healthcare service and its quality dimensions. Our analysis will add to the existing research on how various demographic characteristics of the respondents affect dimensions of quality. Based on the background research conducted, this study proposes to measure the quality of e-Healthcare services under the 5Qs model and to identify the most significant quality dimensions for e-Healthcare services. Reviewing service quality dimensions can help managers and healthcare providers focus on weaknesses and adopt corrective measures.

Three objectives were drawn up in the survey, followed by the framing of the hypothesis for the second objective centered on the review of literature.

O1. To identify the most significant variable in each quality dimension of the 5Qs model leading to the utmost satisfaction of the consumer

O2. To measure consumer satisfaction with e-Healthcare services using the 5Qs model and determine its important predictors

O3. To examine the association of demographic variables with important dimensions of quality and consumer satisfaction

H1. Quality of object is a key predictor of the overall satisfaction of the consumer with e-Healthcare services.

H2. Quality of process is a key predictor of the overall satisfaction of the consumer with e-Healthcare services.

H3. Quality of infrastructure is a key predictor of the overall satisfaction of the consumer with e-Healthcare services.

H4. Quality of interaction is a key predictor of the overall satisfaction of the consumer with e-Healthcare services.

H5. Quality of hospital atmosphere is a key predictor of the overall satisfaction of the consumer with e-Healthcare services.

4. Research methodology

To achieve the research objectives, a case study was designed to collect primary data from two hospitals in Punjab, India, namely PGIMER, Chandigarh (a public hospital), and Fortis Hospital, Mohali (a private hospital), through a structured closed-ended questionnaire, adapted from Zineldin (2006). The questionnaire statements were modified to adapt with e-Healthcare services, divided under five dimensions, namely quality of object (4), quality of process (4), quality of infrastructure (7), quality of interaction (7) and quality of atmosphere (7). The questionnaire included 29 statements in all to be marked on a 1–5 point Likert scale. The demographic criteria of the respondents included in the study were geographic region, occupation, gender, age, education, income per month and marital status.

Out of 22 districts of Punjab, eight districts were identified to select the hospitals that were providing e-Healthcare services. For each of the selected districts, a public and a private hospital were identified. But since permission to collect data could not be attained from all the selected hospitals at the time of the study, two major specialty hospitals with a high volume of patients from the Tricity (Chandigarh, Mohali and Panchkula) were selected for this particular study. This included one public hospital (PGIMER, Chandigarh) and one private hospital (Fortis Hospital, Mohali). Survey questionnaires were personally administered to the people sitting in the waiting halls of each hospital. The respondents were comprised of both the patients and their attendants. Before distributing the questionnaires, respondents confirmed that they were aware of and using e-Healthcare services. The data was collected from both the hospitals between the periods of February 2018 and March 2019. In total, 323 respondents filled the questionnaire, and out of this, 262 were found fit for analysis.

The information gathered for the survey was analyzed using SPSS version 20 to identify the relationship between demographics and quality dimensions. Instrument's reliability was checked using the Cronbach alpha value to measure the internal consistency of the construct. The Cronbach alpha value was greater than the acceptable limit of 0.7 for each dimension of quality (Table 1). The Chi-square test is a beneficial means to test the relationship between different variables, but it also poses a particular weaknesses. Valid only for 2×2 tables, the Chi-square test does not designate the nature of a relationship, and it is not possible to see the extent to which one variable alters as the values of other variables change. Thus, for this study, the Cramer V test was applied as it is a way of calculating corelation in tables with more than 2×2 rows and columns.

5. Results

5.1 Initial data analysis

The initial analysis revealed that out of 262 respondents, 45.4% resided in a rural area and 54.6% resided in an urban area of Punjab, 30.9% were businessmen, 40.5% were employed and 22.1% were students. Out of the total 262 respondents, 71.8% were males and 28.2% were females. 54.2% of the respondents were 20–30 years old, 32.1% were 31–40 years old, 9.5% were 41–50 years old and 4.2% were 51 years and above. The analysis of the education

Table 1. Reliability statistics of various dimensions

Variables	Cronbach alpha value
Quality of object	0.788
Quality of process	0.750
Quality of infrastructure	0.831
Quality of interaction	0.847
Quality of atmosphere	0.764
Consumer satisfaction level	0.850

level of the respondents revealed that 13.2% of the respondents were high school graduates, 48.1% were college graduates, 34.1% were postgraduates and 3.8% had received higher education.

5.2 Analysis for the first objective

Analyzing the primary variable with the help of descriptive statistics, which includes mean and standard deviation.

Table 2 shows that on analyzing consumer satisfaction, quality of object was ranked first, second was quality of interaction and third was quality of atmosphere. Of the five dimensions, quality of infrastructure received the last rank. Table 3 reports the mean and standard deviations of the five quality dimensions. In each dimension of quality, one variable emerged as most important for consumers. In the quality of object question, "the well-being of the hospital" scored the highest mean (3.50), while capability to provide e-Health services scored the lowest. In the quality of process, the statement "e-Health services save a lot of time" scored the highest mean (3.41). In the quality of infrastructure, "having all the necessary skills" scored the highest mean (3.35) while for the quality of interaction in the hospital, "receiving regular updates from the hospital" had the highest mean (3.73). In the quality of atmosphere, the most important variable with the highest mean (3.77) is "hospital having well-informed staff" (Table 3).

5.3 Analysis for the second objective

The strength of the association of overall consumer satisfaction with the five quality constructs is measured by regression analysis. To avoid the problems of multicollinearity due to redundant variables, stepwise regression is engaged to eliminate an earlier entered variable that became redundant. Stepwise regression analysis helped to recognize the best predictor of overall consumer satisfaction. In this model, five quality dimensions functioned as an independent variable, and overall satisfaction served as the dependent variable. The analysis shows that quality of interaction, quality of hospital atmosphere and quality of object are significant predictors of consumer satisfaction with e-Healthcare services. Table 4 reports the strength of the relationship between the dependent variable and the model. The table displays R, R^2 and adjusted R^2 and the standard error of the estimate. The multiple correlation coefficients (R), which are well defined as the linear correlation between the observed and model-predicted values of the dependent variable, obligate a significant value. The high value specifies a strong association between the two constructs. The coefficient of determination (R^2), which is the squared value of the multiple correlation coefficients, is also illustrated in Table 4. It is observed that the quality of the hospital atmosphere, quality of interaction and quality of object cause 55% of the variance in the consumer satisfaction construct.

Table 5 recapitulates the outcomes of an analysis of variance (ANOVA). The ANOVA table tests the suitability of the model from a statistical viewpoint. The import value of the F statistic is less than 0.05, which suggests that the variation explained by the model is not by

Variables	Mean	Std. deviation	Rank
Quality of object	3.45	0.970	1
Quality of interaction	3.87	0.967	2
Quality of atmosphere	3.61	1.316	3
Quality of process	3.28	1.077	4
Quality of infrastructure	3.21	1.126	5

Table 2. Mean, standard deviations and ranking of various dimensions

Item statistics Quality of object	Mean	Std. deviation	*N*
O1_sense of well-being in the hospital	3.50	0.989	1
O2_capability to provide e-Health services	3.41	0.962	4
O3_e-Health services are secure	3.47	0.945	2
O4_e-Health services are provided as promised	3.43	0.987	3

Quality of process	Mean	Std. deviation	Rank
P1_no waiting time with e-appointments	3.25	1.031	3
P2_no waiting time for health tests	3.29	1.012	2
P3_technology makes the admission process simple and clear	3.19	1.131	4
P4_e-Health services save a lot of time	3.41	1.031	1

Quality of infrastructure	Mean	Std. deviation	Rank
F1_hospital has necessary skills to provide e-health services	3.35	1.020	1
F2_skilled staff to perform necessary tests	3.08	1.125	7
F3_skilled doctors to provide e-Health services	3.29	1.152	3
F4_hospital has a website of its own	3.14	1.023	5
F5_doctors' rooms have required technology	3.22	1.095	4
F6_separate registration counter for e-Health services	3.11	1.073	6
F7_hospital has e-Payment facilities	3.31	1.053	2

Quality of interaction	Mean	Std. deviation	Rank
T1_hospital updates regarding treatment	3.73	0.909	1
T2_electronic communication regarding any delays or cancellations	3.49	0.982	5
T3_it is easy and convenient to communicate with the hospital	3.64	0.959	2
T4_ hospital is responsive when contacted via e-mail	3.45	1.007	6
T5_it is possible to communicate with the doctor immediately	3.56	0.972	4
T6_competent and courteous staff provides proper guidance	3.61	0.951	3
T7_instructions regarding medication and billing are given electronically	3.36	0.991	7

Quality of interaction	Mean	Std. deviation	Rank
A1_responsiveness of hospital toward patient needs	3.39	1.048	7
A2_the overall atmosphere of the hospital staff is technology-friendly	3.73	1.008	2
A3_well-informed staff regarding patient's condition	3.77	0.984	1
A4_continous display of electronic health information	3.56	0.988	6
A5_doctors regularly interact electronically with the hospital staff for patient care	3.59	1.001	5
A6_language used in electronic communication is easy to understand	3.61	1.125	4
A7_patients and their attendants are also given instructions to follow infection control measures via electronic display	3.66	1.003	3

Table 3.
Item statistics of each quality dimension

chance. It is perceived that the consumer satisfaction model fits the data well (adjusted $R^2 = 0.545$).

A closer examination of the outcomes in Table 6 displays that the vital explanatory variables, namely quality of interaction, quality of hospital atmosphere and quality of object, are significant predictors of overall consumer satisfaction in e-Healthcare services. All of the coefficients are in the probable course, and the quality of interaction has the uppermost beta coefficient (0.442). Hence, it is concluded that a 54.5% increase in quality of hospital

interaction will result in a 100% gain in overall consumer satisfaction. Satisfaction with e-Healthcare services improves as the consumer's judgment about the quality of interaction, hospital atmosphere and quality of object becomes more encouraging.

5.4 Analysis of third objective

The results of the analysis of association through Cramer *V* test (Table 7) show that different demographic variables have different types of relationship with the three predictors of quality in e-Health. Quality of interaction exhibits a strong and significant association with the region (0.205) and occupation (0.226). Quality of hospital atmosphere shows a moderate and a significant association with the region (0.156) and a strong association with income per month (0.311). The quality of object has a moderate but significant association with the region (0.129) and occupation (0.128).

Table 4. Regression model summary: overall satisfaction and its determinants in e-Health services

Model summary[d]					
Model	*R*	*R* square	Adjusted *R* square	Std. error of the estimate	Durbin–Watson
1	0.690[a]	0.476	0.474	0.235	
2	0.730[b]	0.533	0.529	0.222	
3	0.742[c]	0.550	0.545	0.218	2.197

Note(s): [a]Predictors: (Constant), S_ Interaction
[b]Predictors: (Constant), S_ Interaction, S_ Atmosphere
[c]Predictors: (Constant), S_ Interaction, S_ Atmosphere, S_ object
[d]Dependent Variable: S_ Overall Satisfaction

Table 5. Consumer satisfaction and its determinants

ANOVA[a]						
Model		Sum of squares	df	Mean square	*F*	Sig.
3	Regression	15.037	3	5.012	105.181	0.000d
	Residual	12.295	258	0.048		
	Total	27.332	261			

[a]Dependent Variable: S_ overall Satisfaction

Table 6. Stepwise regression analysis: overall consumer satisfaction and its determinants

Coefficients								
		Unstandardized coefficients		Standardized coefficients			Collinearity statistics	
Model		*B*	Std. error	Beta	*t*	Sig.	Tolerance	VIF
3	(Constant)	0.309	0.092		3.342	0.001		
	S_ Interaction	0.420	0.054	0.442	7.811	0.000	0.543	1.840
	S_ Atmosphere	0.225	0.060	0.215	3.724	0.000	0.523	1.913
	S_ Object	0.193	0.061	0.190	3.151	0.002	0.480	2.083

Note(s): 1) Beta coefficient is the standardized regression coefficient, which allows comparison of the relatives on the dependent variable of each independent variable
2) *T*-statistics help to determine the relative importance of each variable in the model

On analysis of the overall satisfaction of the respondents with e-Health services and the demographics, it shows a significant association with the region (0.188), occupation (0.220) and income per month (0.279). No significant association was found between gender, age, education and marital status and the three predictors of quality and overall satisfaction.

6. Discussion

This study further validates that the 5Qs model is a suitable instrument for determining the healthcare services quality in hospitals. It also indicates that the quality of interaction between the e-Healthcare consumers and the e-Healthcare providers, quality of atmosphere of the hospital and quality of object are important dimensions for measuring patient satisfaction. This research is further able to justify that the 5Qs model is more varied to measure consumer satisfaction in healthcare services.

The initial analysis gives insights into the technology adoption in e-Healthcare services. It reflects that in the Punjab region, it is usually the males who are using e-Healthcare services, indicating gender to be an important demographic criterion. However, as the data has been collected from hospitals, it is possible that in a hospital environment, it is usually the male members who accompany the patients. Most of the people belonging to the age group of 20–40 years also suggest that e-Healthcare services are widely acceptable and more popular in the younger generation. The results specify that age is an important criterion for technology acceptance in healthcare services, though it is beyond the scope of this paper. High recognition of e-Healthcare services within the educated respondents suggests that education has a central role in the usage of e-Healthcare services. It is assumed that more educated people are more e-Health literate. The results support the finding of Neter and Brainin (2012) that younger and more educated people will be more literate in e-Health. The awareness regarding the requirements of e-Healthcare services is more in educated people, along with the process of delivery of e-Healthcare services. Respondents having higher literacy in e-Health will benefit more than people with less awareness (Neter and Brainin, 2012). The overall ranking of the dimensions of quality shows that most of the respondents are positive toward the quality of object, quality of interaction and quality of atmosphere of the hospitals providing e-Healthcare services. This shows that technology has an essential role in affecting the quality of interaction and quality of atmosphere of the hospitals in this part of India. The results are almost similar to the study done by Ajarmah *et al.* (2017) in a military hospital, Jordan, as in both the studies, quality of process attained the last rank. In the quality of object, the lowest score with the capability to provide e-Healthcare services indicates that various hospitals in the region have introduced e-Healthcare services but due to partial implementation, all the benefits of e-Healthcare services are not available to the consumers.

Table 7. Association of demographic variables with the various dimensions of quality

S. no.	Demographic variable	Test	Quality dimension			Overall satisfaction with e-Health
			Quality of interaction	Quality of hospital atmosphere	Quality of object	
1	Region	Cramer V test	0.205***	0.156**	0.129**	0.188**
2	Occupation	Cramer V test	0.226**	0.100	0.198**	0.220**
6	Income per month	Cramer V test	0.183(NS)	0.311***	0.157(NS)	0.279***

Note(s): 0.3> Strong Association, **<0.05, ***<0.001 (Significance of Association), NS = Not Significant

Table 3 shows the ranking of the questions in each of the five constructs of quality. In the quality of object, the high mean score of the question related to the sense of well-being indicates its importance in determining the quality of object. It also suggests that public and private hospitals in this region can provide a sense of well-being to their consumers. Sense of well-being also emerged as the most important variable in the study done by Camgöz-Akdağ and Zineldin (2010) in hospitals of Turkey. Here, the results are different from the study done by Ajarmah *et al.* (2017), where the feeling of well-being secures the least rank. The difference could be because the use of technology makes a system more organized and creates a positive impact on the consumer's mind. In the quality of process, the highest rank is for the question asking if e-Health services save much time, which suggests that the consumers feel that the use of technology to avail healthcare services helps to save time. Here also, the results are different from the study of Ajarmah *et al.* (2017), where this question results in maximum dissatisfaction. The difference in results justifies the role of technology in increasing the speed of work, thus saving time. While the least rank for the question related to technology makes the admission process simple and clear, which indicates that technology is not used in all areas of healthcare services. In the quality of infrastructure, most of the respondents were satisfied with the skills available in the hospital to provide e-Healthcare services and the rooms having the required technology. However, they were least satisfied with the availability of skilled staff to perform necessary tests, which indicates that more efforts are required to train the staff technically, enhanced results will lead to improved consumer satisfaction. In the quality of interaction, the respondents are satisfied with the regular updates regarding their treatment, which indicates that technology is helping in better interaction with the hospital. However, the least score for the question related to instructions regarding medication and billing highlights the lack of use of electronic prescriptions in the hospitals of this region. In the quality of atmosphere, most of the respondents are satisfied with the staff being updated on the patient's medical condition, which shows that technology is playing a vital role in the continuous flow of information within the staff of the hospital. The high scores of the statement in quality of interaction, quality of atmosphere and quality of object suggest that technology is playing an essential role in making communication faster and convenient for the consumers.

The regression analysis shows that the quality of interaction is the most significant dimension in measuring the satisfaction of the consumers, followed by the quality of atmosphere. However, the quality of infrastructure did not emerge as a significant dimension for e-Healthcare services. The features of the partners and the type of interaction affect the atmosphere of the hospital (Zineldin and Zineldin, 2014). The results add to the findings of the studies done by Zineldin (2006), Camgöz-Akdağ and Zineldin (2010) on Egyptian hospitals, Jordanian hospitals, Kazakhstanian hospitals and also in Turkish hospitals, which found the quality of interaction and infrastructure, quality of atmosphere and quality of object to be significant quality dimensions for consumer satisfaction. The results are also similar to the study done by Ajarmah *et al.* (2017) as they found that hospital atmosphere has the highest impact on patient satisfaction and that it is critical for overall service quality. Hence, we can conclude that if e-Healthcare providers provide a comfortable atmosphere for the consumers, they will have a higher satisfaction rate with the e-Healthcare services. Significance with infrastructure and process is not a finding of this study; this could suggest that for e-Health services, if other dimensions of quality are satisfactory, consumers of this region do not give much prominence to the infrastructure of the system. However, the results of the study done in Turkey found that quality of hospital infrastructure and interaction are the most important dimensions for consumer satisfaction (Camgöz-Akdağ and Zineldin, 2010). Another study done by Zineldin *et al.* (2014), in Chinese hospitals, found that infrastructure and atmosphere have significant effects on satisfaction. However, it contrasts with the study done by Badri *et al.* (2009), where information impacts satisfaction negatively. Reliability and

responsiveness emerged to be the most significant dimensions of patient satisfaction in the study done by Meesala and Paul (2018). Differences in the result might be because technology is the fastest and most convenient way of information delivery and therefore could be the main reason for availing e-Healthcare services.

This study found that there is no significant association of consumer satisfaction with age, gender, education and marital status. Choi *et al.* (2005), in their study, also found no variation in patient satisfaction with gender or age. Similarly, Tucker and Adams (2001) found that consumer satisfaction was affected by the performance and availability of services, but it was not affected by age, gender, education, race or marital status. Baldwin and Sohal (2003) also reported a similar result in their study. However, Venn and Fone (2005) reported variation in patient satisfaction based on age, gender, employment status and marital status. The strong association of occupation with quality of interaction and hospital atmosphere suggests that working people have more experience of interacting with different types of stakeholders; thus, they give more value to the quality of interaction and the atmosphere while availing e-Healthcare services. A strong association of the respondent's income per month with quality of interaction and hospital atmosphere suggests that the perception of consumers varies with the amount of money they can afford to spend on e-Healthcare services. When consumers are paying more for e-health services, their expectations with the hospital atmosphere will be higher. Overall satisfaction of e-Health services reflects a strong association with the region, occupation and income per month of the consumers. The results are similar to the study done by Mummalaneni and Gopalakrishna (1995), which found income to be the most important demographic factor of all to affect overall patient satisfaction. The results also suggest that quality perceptions of the e-Healthcare consumers are the same and do not vary with age, gender, education and marital status. However, Meesala and Paul (2018), in their study, found that only the gender influenced the patient's evaluation of satisfaction, but age and marital status did not affect.

7. Implications

The results of this study will help the e-Healthcare providers better understand dimensions influencing the satisfaction of consumers based on their demographic characteristics such as region, occupation and income levels. The variation in the adoption of e-Healthcare services according to the demographic characteristics will help to improve the design of the e-Healthcare services and also facilitate developing better marketing strategies. Consumer-specific e-Healthcare designs will allow more extensive adoption of e-Healthcare services and will result in better health outcomes. The healthcare policymakers and e-Healthcare providers can further improve awareness in the regions with less acceptability for e-Healthcare services.

8. Conclusion

Healthcare quality is discussed more commonly with the SERVQUAL model. This study has been successful in giving the insight that in healthcare services, 5Qs is a more comprehensive model with wider quality dimensions to measure consumer satisfaction. Quality of interaction, hospital atmosphere and quality of object emerged to be the key predictors in e-Healthcare services. The results are further able to prove the importance of these three dimensions in the consumer satisfaction construct. For good-quality interaction in e-Healthcare services, it is important to provide regular and timely updates, quick and easy means of communication. Competent and courteous staff and responsiveness play a significant role for the consumers. In e-Healthcare services, well-informed staff, technology-friendly hospitals and communication via electronic devices constitute the quality of

atmosphere. Secure e-Healthcare services, delivery of promised services and a sense of well-being constitute the quality of object. Efforts by the e-Healthcare providers on all these aspects will result in improved quality and more satisfaction. However, more efforts are required in infrastructure and process of delivery of e-Healthcare services with more responsiveness to improve consumer satisfaction. This study suggests that demographic characteristics such as age, education, marital status and gender do not have any significant association with consumer satisfaction regarding e-Healthcare services, though these characteristics do impact the technology adoption in healthcare services in the area of study. The e-Healthcare providers need to be sensitive to the requirements of the consumers based on different dimensions such as region (urban and rural), income and occupation for better adoption and understanding of e-Healthcare services and higher consumer satisfaction.

9. Limitations

There are certain limitations also in this study. The focus of the study is on e-Healthcare services only, which is in the initial stages of adoption in various hospitals and thus not used widely. The extent of availability of e-Healthcare services in different parts of the state will also affect the views of the general population. The sample of the study was small and represented only a section of the population of Punjab, India region. Also, a comparison between public and private hospitals is beyond the scope of this paper.

10. Future research

Future research can be done on a larger population to study the demographic variables in detail, which will give a better representation of the results. Technology adoption in healthcare often varies with demographic characteristics such as region, income and occupation of the consumers. A study for comparison of e-Healthcare consumers of the rural and urban region and private and public sector hospitals can be performed. Similar studies can be done in various other states of India to study the variations in association of demographic characters. Further research will help healthcare providers and policymakers to have a better understanding of the Indian "e-Healthcare consumer" and provide need-based services.

References

Ajarmah, B.S., Hashem, T.N. and Swies, R.J. (2017), "The effect of 5Q model on patient's satisfaction in military hospitals in Jordan", *International Journal of Productivity and Quality Management*, Vol. 20 No. 3, pp. 273-290.

Akter, S., D'Ambra, J. and Ray, P. (2013), "Development and validation of an instrument to measure user perceived service quality of m-Health", *Information and Management*, Vol. 50 No. 4, pp. 181-195.

Aliman, N.K. and Mohamad, W.N. (2016), "Linking service quality, patients' satisfaction and behavioral intentions: an investigation on private healthcare in Malaysia", *Procedia-Social and Behavioral Sciences*, Vol. 224, pp. 141-148.

Al-Neyadi, H.S., Abdallah, S. and Malik, M. (2018), "Measuring patient's satisfaction of healthcare services in the UAE hospitals: using SERVQUAL", *International Journal of Healthcare Management*, Vol. 11 No. 2, pp. 96-105.

Badri, M., Attia, S. and Ustadi, A. (2009), "Healthcare quality and moderators of patient satisfaction: testing for causality", *International Journal of Health Care Quality Assurance*, Vol. 22 No. 4, pp. 382-410.

Bakar, C., Seval Akgün, H. and Al Assaf, A. (2008), "The role of expectations in patients' hospital assessments: a Turkish university hospital example", *International Journal of Health Care Quality Assurance*, Vol. 21 No. 5, pp. 503-516.

Baldwin, A. and Sohal, A. (2003), "Service quality factors and outcomes in dental care", *Managing Service Quality*, Vol. 13 No. 3, pp. 207-16.

Batbaatar, E., Dorjdagva, J., Luvsannyam, A., Savino, M.M. and Amenta, P. (2017), "Determinants of patient satisfaction: a systematic review", *Perspectives in Public Health*, Vol. 137 No. 2, pp. 89-101.

Bishop Gagliano, K. and Hathcote, J. (1994), "Customer expectations and perceptions of service quality in retail apparel specialty stores", *Journal of Services Marketing*, Vol. 8 No. 1, pp. 60-69.

Butler, D., Oswald, S.L. and Turner, D.E. (1996), "The effects of demographics on determinants of perceived healthcare service quality: the case of users and observers", *Journal of Management in Medicine*, Vol. 10 No. 5, pp. 8-20.

Butt, M.M. and de Run, E.C. (2010), "Private healthcare quality: applying a SERVQUAL model", *International Journal of Health Care Quality Assurance*, Vol. 23 No. 7, pp. 658-673.

Camgöz-Akdağ, H. and Zineldin, M. (2010), "Quality of health care and patient satisfaction: an exploratory investigation of the 5Qs model at Turkey", *Clinical Governance: An International Journal*, Vol. 15 No. 2, pp. 92-101.

Cheng Lim, P. and Tang, N. (2000), "A study of patients' expectations and satisfaction in Singapore hospitals", *International Journal of Health Care Quality Assurance*, Vol. 13 No. 7, pp. 290-299.

Choi, K., Lee, H., Kim, C. and Lee, S. (2005), "The service quality dimensions and patient satisfaction relationships in South Korea: comparisons across gender, age and types of service", *Journal of Services Marketing*, Vol. 19 No. 3, pp. 140-149.

Dagger, T.S., Sweeney, J.C. and Johnson, L.W. (2007), "A hierarchical model of health service quality: scale development and investigation of an integrated model", *Journal of Service Research*, Vol. 10 No. 2, pp. 123-142.

Deber, R.B., Kraetschmer, N., Urowitz, S. and Sharpe, N. (2005), "Patient, consumer, client, or customer: what do people want to be called?", *Health Expectations*, Vol. 8 No. 4, pp. 345-351.

Fincham, J.E. and Wertheimer, A.I. (1986), "Predictors of patient satisfaction in a health maintenance organization", *Journal of Health Care Marketing*, Vol. 6 No. 3, pp. 5-116.

Geetha Rani, P. (2014), "Disparities in earnings and education in India", *Cogent Economics and Finance*, Vol. 2 No. 1, pp. 1-18.

Gohain, K., Thambiah, S. and Hong, T.C. (2018), "Patients loyalty framework towards healthcare services in Malaysia", *International Journal of Business and Management*, Vol. 13 No. 9, pp. 148-152.

Grazier, K.L., Richardson, W.C., Martin, D.P. and Diehr, P. (1986), "Factors affecting choice of health care plans", *Health Services Research*, Vol. 20 No. 6, pp. 659-82.

Gronroos, C. (2000), *Service Marketing and Management: A Customer Relationship Management Approach*, John Wiley & Sons, West Sussex.

Gupta, K.S. and Rokade, V. (2016), "Importance of quality in health care sector: a review", *Journal of Health Management*, Vol. 18 No. 1, pp. 84-94.

Hansman, H. and Schutjens, V. (1993), "Dynamics in market segmentation: a demographic perspective on age-specific consumption", *Marketing and Research Today*, Vol. 21 No. 3, pp. 139-147.

Haron, S.N., Hamid, M.Y. and Talib, A. (2012), "Towards healthcare service quality: an understanding of the usability concept in healthcare design", *International Journal of Engineering Research and Technology*, Vol. 1 No. 8, pp. 2278-0181.

Izadi, A., Jahani, Y., Rafiei, S., Masoud, A. and Vali, L. (2017), "Evaluating health service quality: using importance-performance analysis", *International Journal of Health Care Quality Assurance*, Vol. 30 No. 7, pp. 1-9.

Jauch, L.R. and Orwig, R.A. (1997), "A violation of assumptions: why TQM won't work in the ivory tower", *Journal of Quality Management*, Vol. 2 No. 2, pp. 279-292.

Javed, S.A., Liu, S., Mahmoudi, A. and Nawaz, M. (2019), "Patients' satisfaction and public and private sectors' health care service quality in Pakistan: application of grey decision analysis approaches", *The International Journal of Health Planning and Management*, Vol. 34 No. 1, pp. e168-e182.

Kalepu, R.N.P. (2014), "Service quality in healthcare sector: an exploratory study on hospitals", *The IUP Journal of Marketing Management*, Vol. 13 No. 1, pp. 7-28.

Kotler, P. and Armstrong, G. (1991), *Principles of Marketing*, 5th ed., Prentice-Hall, Englewood Cliffs, NJ, Managing Service Quality, Vol. 13 No. 3, pp. 207-216.

Manulik, S., Karniej, P. and Rosińczuk, J. (2018), "The influence of socio-demographic characteristics on respondents' perceptions of healthcare service quality", *Journal of Education, Health and Sport*, Vol. 8 No. 12, pp. 708-724.

Meesala, A. and Paul, J. (2018), "Service quality, consumer satisfaction and loyalty in hospitals: thinking for the future", *Journal of Retailing and Consumer Services*, Vol. 40, pp. 261-269.

Mummalaneni, V. and Gopalakrishna, P. (1995), "Mediators vs moderators of patient satisfaction", *Journal of Heath Care Marketing*, Vol. 15 No. 4, pp. 17-22.

Naidu, A. (2009), "Factors affecting patient satisfaction and healthcare quality", *International Journal of Health Care Quality Assurance*, Vol. 22 No. 4, pp. 366-381.

Naik, J.R.K., Anand, B. and Bashir, I. (2015), "An empirical investigation to determine patient satisfaction factors at tertiary care hospitals in India", *International Journal of Quality and Service Sciences*, Vol. 7 No. 1, pp. 2-16.

Neter, E. and Brainin, E. (2012), "eHealth literacy: extending the digital divide to the realm of health information", *Journal of Medical Internet Research*, Vol. 14 No. 1, p. e19.

Palani Natha Raja, M., Deshmukh, S.G. and Wadhwa, S. (2007), "Measuring service quality in technical education and healthcare services", *International Journal of Services and Operations Management*, Vol. 2 No. 3, pp. 222-236.

Parasuraman, A., Zeithaml, V.A. and Berry, L.L. (1988), "Servqual: a multiple-item scale for measuring consumer perception", *Journal of Retailing*, Vol. 64 No. 1, p. 12.

Parasuraman, A., Zeithaml, V.A. and Malhotra, A. (2005), "ES-QUAL: a multiple-item scale for assessing electronic service quality", *Journal of Service Research*, Vol. 7 No. 3, pp. 213-233.

Strasser, S., Schweikhart, S., Welch, G.E. and Burge, J.C. (1995), "Satisfaction with medical care", *Journal of Health Care Marketing*, Vol. 15 No. 3, pp. 34-43.

Swain, S. (2019), "Do patients really perceive better quality of service in private hospitals than public hospitals in India?", *Benchmarking: An International Journal*, Vol. 26 No. 2, pp. 590-613.

Talib, F., Azam, M. and Rahman, Z. (2015), "Service quality in healthcare establishments: a literature review", *International Journal of Behavioural and Healthcare Research*, Vol. 5 Nos 1-2, pp. 1-24.

Thompson, A. and Kaminski, P. (1993), "Psychographic and lifestyle antecedents of service quality expectations: a segmentation approach", *Journal of Services Marketing*, Vol. 7 No. 4, pp. 53-61.

Tucker, J.L. and Adams, S.R. (2001), "Incorporating patients' assessments of satisfaction and quality: an integrative model of patients' evaluations of their care", *Managing Service Quality*, Vol. 11 No. 4, pp. 272-87.

Venn, S. and Fone, D.L. (2005), "Assessing the influence of socio-demographic factors and health status on expression of satisfaction with G.P. services", *Clinical Governance: An International Journal*, Vol. 10 No. 2, pp. 118-125.

Zeithaml, V.A., Bitner, M.J., Gremler, D.D. and Pandit, A. (2000), *Services Marketing: Integrating Customer Focus across the Firm*, 2nd ed., Irvin /McGraw-Hill, Boston.

Zineldin, M., Akdag, H.C. and Belal, M. (2012), "Total relationship management (trm) and 5 qs model as new management techniques: a comparative study for a knowledge-intensive sector", *International Business and Management*, Vol. 4 No. 1, pp. 1-17.

Zineldin, M. and Vasicheva, V. (2012), "The implementation of TRM philosophy and 5Qs model in higher education-an exploratory investigation at a Swedish university", *Nang Yan Business Journal*, Vol. 1 No 1, pp. 65-75.

Zineldin, M. and Zineldin, J. (2014), "Total medical and healthcare quality, satisfaction and patient safety (TMHQ)", *International Journal of Medical Sciences and Health Care*, Vol. 2 No 9, pp. 1-10.

Zineldin, M., Zineldin, J. and Vasicheva, V. (2014), "Approaches for reducing medical errors and increasing patient safety: TRM, quality and 5 Qs method", *The TQM Journal*, Vol. 26 No. 1, pp. 63-74.

Zineldin, M. (2006), "The quality of health care and patient satisfaction: an exploratory investigation of the 5Qs model at some Egyptian and Jordanian medical clinics", *International Journal of Health Care Quality Assurance*, Vol. 19 No. 1, pp. 60-92.

Corresponding author
Prachi Verma can be contacted at: drprachiverma@gmail.com